Relational Actions Relationally

Jan Christiansen

Fachhochschule Flensburg
Fachbereich 3
D-24943 Flensburg
jan.christiansen@fh-flensburg.de

Nikita Danilenko

CAU Kiel
Institut für Informatik
Olshausenstraße 40
D-24098 Kiel
nda@informatik.uni-kiel.de

Sandra Dylus

CAU Kiel
Institut für Informatik
Olshausenstraße 40
D-24098 Kiel
sad@informatik.uni-kiel.de

Free theorems are a powerful tool for deriving properties of polymorphic functions from their type. In the context of type constructor classes, certain relational actions (functions on relations) are a convenient tool for the derivation of these properties [Voi09]. These relational actions are often expressible in terms of purely relation-algebraic terminology like composition or inverse. The relational approach often provides arguments that are clearer and better structured than usual, component-wise reasoning. Additionally, relational reasoning can be verified using proof assistants. We study, how relational methods can be applied to prove that relational actions satisfy the required properties for the application of free theorems.

References

[Voi09] Janis Voigtländer. Free Theorems Involving Type Constructor Classes: Functional Pearl. In *Proceedings of the 14th ACM SIGPLAN International Conference on Functional Programming, ICFP 2009*, pages 173–184, 2009.